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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,898	10/01/2004	Hiroto Ohtake	Q83944	2975

23373 7590 10/03/2006

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EXAMINER
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HO, HOANG QUAN TRAN

ART UNIT	PAPER NUMBER
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2818

DATE MAILED: 10/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/509,898

Applicant(s)

OHTAKE ET AL.

Examiner

Hoang-Quan Ho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4, 19 and 20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 19 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

Applicant's amendment dated July 5, 2006 in which claims 1 – 2 and 4 were amended, no claims were cancelled, claims 5 – 18 were withdrawn, and claims 19 – 20 were added has been entered of record.

### ***Response to Arguments***

Applicant's arguments filed July 5, 2006 have been fully considered.

Applicant's arguments, see page 7, with respect to claim 1 have been fully considered but they are not persuasive. See claim 1 based on Shinichi (JP Pub. No. 2000-114367) rejection for the reasoning. Also, upon further consideration, a new ground(s) of rejection is made in view of Ryukichi et al (JP Pub. No. 2000-036484), for which the reference was cited in the previous Office Action.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 – 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Ryukichi et al (JP Pub. No. 2000-036484) hereinafter as Ryukichi.

Regarding claim 1, drawings 13 and 14 of Ryukichi teaches a semiconductor device comprising:

an organic insulating film (par. 0001) having an opening (see drawings 13 – 14), wherein said organic insulating film has a plurality of modified portions facing (see drawings 13 – 14, where the plurality of the modified portions consists of going through two layers, where the plurality of modified portions include each surrounding sides of the opening of each layer and the bottom portion of the opening hole) said opening, and

said modified portions includes nitrogen atoms (par. 0005).

Regarding claim 2, Ryukichi teaches wherein said modified portion further comprises fluorine atoms (par. 0041 – 0042), and a concentration of said fluorine atoms in said modified portion is lower than a concentration of said nitrogen atoms (see table 6).

Regarding claim 3, Shinichi teaches further comprising:

a metal conductor whose main component is copper, formed in said opening (par. 0011).

Regarding claim 4, Shinichi wherein said metal conductor is in direct contact with said modified portion (par. 0011).

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Shinichi (JP Pub. No. 2000-114367).

Regarding claim 1, drawings 1 – 4 of Shinichi teaches a semiconductor device comprising:

an organic insulating film (11) having an opening (Para. 0014),

wherein said organic insulating film has a plurality of modified portions facing (Para. 0014; see drawings 1 – 4, where the plurality of modified portions include each surrounding sides of the opening and the bottom portion of the opening hole) said opening, and

said modified portions includes nitrogen atoms (par. 0014).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

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under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2 – 4 and 19 – 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinichi (JP Pub. No. 2000-114367) as applied to claim 1 above, and further in view of Ellingboe et al (U.S. Patent No. 6,114,250).

Regarding claim 2, Shinichi fails to teach wherein said modified portion further comprises fluorine atoms, and a concentration of said fluorine atoms in said modified portion is lower than a concentration of said nitrogen atoms. Ellingboe discloses that it is known in the art that fluorine is provided in the modified portion and is lower than the concentration of nitrogen (Col. 1, Lines 57 – 67). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the etching means that is disclosed in Ellingboe's invention, so that fluorocarbons are added in order to control the form of the film (Col. 1 Lines 57 – 67 and Col. 2, Lines 44 – 54).

Regarding claim 3, Shinichi teaches further comprising:  
a metal conductor whose main component is copper (15), formed in said opening (par. 0013).

Regarding claim 4, Shinichi wherein said metal conductor is in direct contact with said modified portion (par. 0013 – 0017).

Regarding claim 19, Shinichi teaches wherein the metal conductor comprises a barrier film whose main component is tantalum (par. 0037).

Regarding claim 20, Shinichi teaches wherein the barrier film is in direct contact with the modified portions (par. 0037; since the barrier film 15 consists Cu and Ta are formed in the opening, it is considered touching the modified portions).

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

This action is a **final rejection** and is intended to close the prosecution of this application. Applicant's reply under 37 CFR 1.113 to this action is limited either to an appeal to the Board of Patent Appeals and Interferences or to an amendment complying with the requirements set forth below.

If applicant should desire to appeal any rejection made by the examiner, a Notice of Appeal must be filed within the period for reply identifying the rejected claim or claims appealed. The Notice of Appeal must be accompanied by the required appeal fee.

If applicant should desire to file an amendment, entry of a proposed amendment after final rejection cannot be made as a matter of right unless it merely cancels claims or complies with a formal requirement made earlier. Amendments touching the merits of the application which otherwise might not be proper may be admitted upon a showing a good and sufficient reasons why they are necessary and why they were not presented earlier.

A reply under 37 CFR 1.113 to a final rejection must include the appeal from, or cancellation of, each rejected claim. The filing of an amendment after final rejection, whether or not it is entered, does not stop the running of the statutory period for reply to the final rejection unless the examiner holds the claims to be in condition for allowance. Accordingly, if a Notice of Appeal has not been filed properly within the period for reply, or any extension of this period obtained under either 37 CFR 1.136(a) or (b), the application will become abandoned.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoang-Quan Ho whose telephone number is (571) 272-8711. The examiner can normally be reached on Monday - Friday, 8AM - 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HQH  
September 15, 2006

*Andy Nguyen*  
Primary Examiner